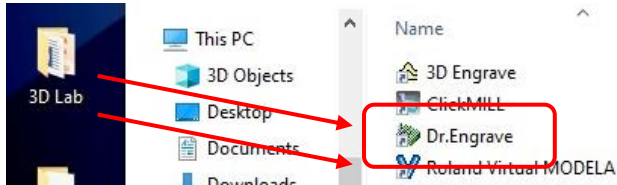


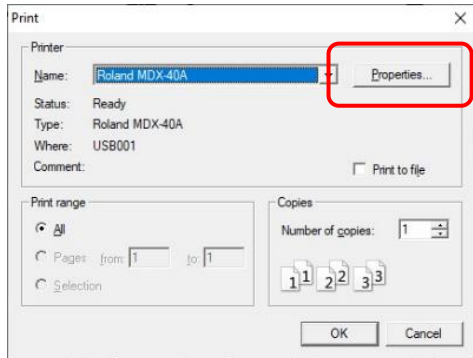
# FLAT ENGRAVING WITH THE CNC MILL

## Create your design

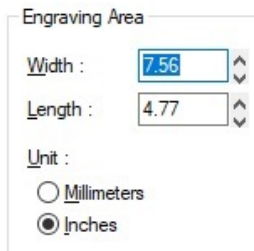
1. Start Dr.Engrave from 3D Lab > Roland CNC Machine folder on desktop.



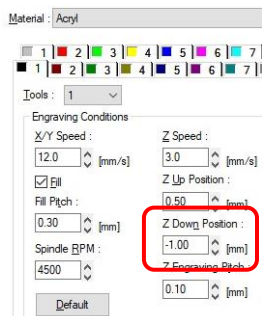
2. Choose File > Print Setup from menu, then choose Roland MDX-40A printer, then click Properties.



3. On Size tab, set width and length to your material size.



4. On Tool tab, set material type. Set Z Down for total depth of cut you need (as a negative number). Click OK twice to return to main program.



Z Engraving Pitch is how much material is removed for each layer (do not change).

5. Choose File > Import to import BMP bitmap graphics which can be traced into a vector.
  - a. **Do not import DXF files** as they may cause Dr.Engrave to crash.
  - b. Use Microsoft Paint to convert JPG files to BMP.
6. Add text and simple graphics using toolbar

(next column)

- a. For text or graphics that need filled (if you do not want it engraved as an outline), click object, then click Fill in the toolbar.

7. For text, the "Make Stroke Font" toolbar button uses a font that is single line (not an outline of a typical font) which looks nicer engraved.

## Insert material

1. **If rotatory access unit is installed, ask lab staff to remove it.**
2. Clean debris from machine's brown bed.
3. Affix material to bed with double sided foam tape. **Use tape sparingly** as it can be difficult to remove later. Use ruler to arrange material as square as possible.

## Insert milling bit

1. Remove existing bit from the toolhead with two black wrenches. Squeeze wrenches toward from each other to loosen.



2. Find bit you want to use from "short reach" bag of bits.
3. Find collet that snugly (**not loosely**) fits your bit from bag of collets.

4. Insert bit into the collet
  - a. **Bit shaft faces threaded collet end.**
  - b. Bit shaft should be inserted about 2/3 into collet.



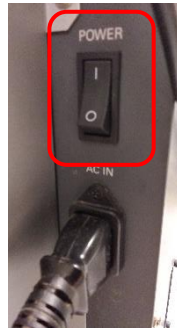
5. Screw collet-with-bit into machine's toolhead. Use the two black wrenches to tighten it (do not over tighten).
  - a. Push wrenches apart to tighten.

(flip page)

## Set XYZ axis

1. Place round, brass sensor (inside machine) on the top of your material.
2. **Close lid.**
3. Turn on machine via switch in back.

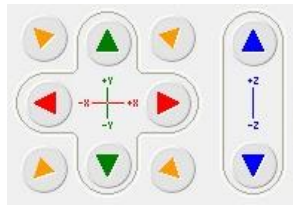
4. Hold down small, black & green power button on front of machine until Modeling and Scanning lights are lit.



5. On computer's desktop, open 3D Lab > Roland CNC Machine > VPanel
  - a. Do not close Dr.Engrave; you will need it later.

6. Click **Low Speed** radio button.

7. Use green & red arrows to position toolhead directly above the brass sensor.

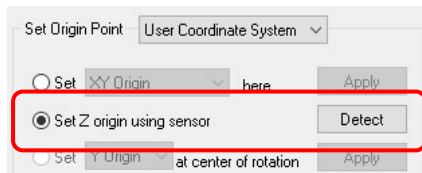


8. Use the blue up & down arrows to **CAREFULLY lower toolhead closer to brass sensor** to aid in centering toolhead on sensor.

- a. **DO NOT make mill bit touch sensor!**



9. Click "Set Z origin using sensor" radio button, then click Detect.

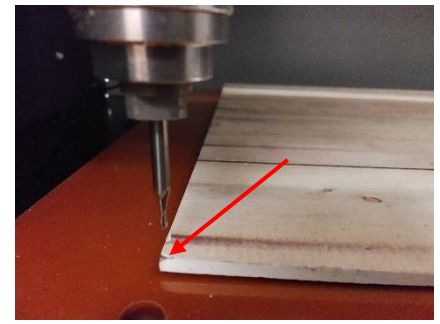


10. When detection finishes, **remove brass sensor** (place it in a corner inside mill).

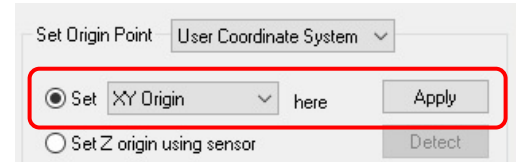
11. **Close lid.**

(next column)

12. Use left/right/up/down buttons to move toolhead to lower-left corner of material. **DO NOT make mill bit touch material!**



13. In "Set X Origin here" radio button field, change it to "XY Origin", then click Apply.



## Begin milling

1. In Dr.Engrave, click File > Print > Roland MDX-40A > Properties.
2. **Verify** material size, material type, and Z Down settings are what you set earlier in these instructions. When finished, click OK to close Properties window.
3. At Print window, click OK to begin milling.
  - a. **If you need to immediately stop milling for an emergency, firmly push large red knob in top-right front of machine.**
  - b. You can also click Quit Cutting at the bottom of VPanel.

## When milling has finished

1. After toolhead stops moving and rotating, press View button on front of mill.
2. When brown bed slides forward and stops, open lid.
3. Carefully pry your material from the bed. **If using a scraper, take care not to scratch the bed.**
4. Remove collet & bit from tool head, store each in respective bags.
5. **Please cleanup debris inside the machine with the Shop Vac under its table.**

